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COMPLETE SPECIFICATION

Improvements in Antifoam Agents

We, FABRIQUES DE LEVURE, SUCRE & ALCOOLS DE SAINT-OUEN-L'AUMONE, a French body corporate, of 15, Rue du Louvre, Paris (Seine), France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

It is known that in many industries, foams develop during certain steps of manufacturing processes.

These foams are generally destroyed by utilizing so-called antifoam agents of which both the composition and the efficiency are eminently variable.

These antifoam agents made generally from fatty substances are characterized by certain inconveniences due either to their lack of stability or to their short useful life, or to the compounds they form by reacting with the treated products, or to the clogging of the various apparatus utilized during the manufacturing processes, notably fermentation vats, distilling apparatus, evaporators, concentrators, heaters, coolers, etc.

Mixtures containing a relatively high percentage of organo-silicic derivatives, an emulsifier, a stabilizer and water are also used as antifoam agents.

The present invention relates to high-efficiency antifoam products which are free from the inconveniences set forth hereinabove characterizing conventional antifoam agents made from fatty substances, and are efficient even with a low content of active substance.

These antifoams are suitable for use in all industries where the development of foams is to be counteracted.

The antifoam agent according to this invention, which consists of an emulsion of the "oil in water" or "water in oil" type, and comprises an organo-polysiloxane, an emulsifier, a stabilizer and water, is characterized in that it consists of from 0.5 to 3% by weight of an organo-poly-siloxane soluble in alcohol

and oil and insoluble in water, of from 20 to 30% by weight of a fatty substance of animal, vegetable or mineral origin, of from 5 to 10% by weight of an emulsifier, of from 1 to 4% by weight of a stabilizer, and of make-up water.

The organo poly-siloxane may consist, for example, of the substance manufactured and marketed under the Registered Trade Mark "Rhodorsil Oil 3322" by the Rhône-Poulenc Company. The physical characteristics of this substance are as follows:—

Density	-	-	99
Surface tension	-	-	22 dynes per c.c.
Refractive index	-	-	1.443
Viscosity at 25° C.	-	-	95 cst.

Its good miscibility in fatty substance ensures a perfect dispersion of this active product in the antifoam agent.

As a fatty substance of vegetable origin, peanut oil and colza oil may be used, and as a fatty substance of animal origin, fish oil and horse fat are suitable; if a mineral fatty substance is preferred, paraffin oil, petroleum jelly and solid paraffinic greases are adequate. The choice of the origin of the fatty substance is subordinate to the specific use contemplated for the antifoam agent in a given industry.

The function of the emulsifier is to disperse the active product and that of the stabilizer is to stabilize the dispersion of the active product whereby the action of the anti-foam on the surface of the liquids is improved.

Preferably, the emulsifier is selected among the polyoxyethylenated derivatives of the oleic acid. For example, dioleate of polyethylene glycol which is a product soluble in oils, alcohol and hydrocarbons, and having a density of 1.03 at 25° C. may be used.

As a stabilizer, a fatty acid ester of polyhydric alcohol such as a mixture of glycerol mono- and distearate (m.p.=56° C. and density=.97 at 25° C.) may be used.

Moreover, these antifoam products are

characterized in that they are available in liquid or pasty form. They can be sterilized due to their stability between 0° and 140° C.

Other additional advantages can be obtained in certain industries due to the various characteristics of this novel antifoam agent. Thus, notably in the yeast industry, it assists in improving the quality of the end product.

Since conventional antifoam agents made from fatty substances of animal or vegetable origin cannot be eliminated completely by repeated washings, a faster decrease in quality by oxidation and rancidness is observed.

As the novel antifoam agent according to this invention may comprise a fatty substance of mineral origin and therefore be free of any fatty substance of animal or vegetable origin, this inconvenience is eliminated. In any case, its fatty substance content is considerably lower than that of conventional antifoams.

The antifoam agent according to this invention contains from 50 to 60% of water and has a relatively low content of fatty substances. It will facilitate greatly filtration steps, notably in the case of vacuum filtration, for the presence of excess fatty substance may render this process somewhat difficult.

The stability of the product, by permitting the sterilization, assists in obtaining a perfect biological purity.

In the preparation of alcohols and similar substances the use of this novel antifoam will improve considerably the cleanness of the various distillation, heating and other apparatus, still on account of the relatively low proportion of fatty substances in the product.

In the sugar industry, the same advantage is obtained in evaporators and vacuum pans.

The rate of consumption of this improved antifoam, under the same conditions of use, is lower than that of conventional antifoam products, for its efficiency is greater. For a same result, the quantity necessary will be generally three times smaller.

EXAMPLE 1.

This antifoam is prepared in two steps:—

- (1) A mixture of:—
 - 20% of paraffin oil;
 - 10% of peanut oil;
 - 3% of silicone oil marketed under the R.T.M. "Rhodorsil Oil 3322" by the Rhône Poulenc Company;
 - 3% of silicone oil marketed under the name (m.p. 56° C. density 0.97 at 25° C.); and
 - 10% of diolate of polyethylene glycol (density 1.03 at 25° C.) is heated to a temperature of from 55 to 60° C.
- (2) To this mixture about 54% of water also heated to 55 to 60° C. are added by small amounts.

During the addition of water, the mixture is stirred continuously.

At the end of this operation, the mixture is further stirred during about fifteen minutes.

Subsequently, the whole of the product thus prepared is cooled. During the cooling, the mixture is stirred and homogenized continuously.

The operation is completed when the temperature of the product has fallen to 30° C.

EXAMPLE 2.

Fatty substances of solid mineral origin, such as vaseline, may also be used. In this case, finer emulsions are obtained.

If desired, solid substances of paraffinic origin may be incorporated in the product.

The choice of the final consistency of the anti-foam agent is subordinate to the nature of the foam to be destroyed.

In this case the formula will be established as follows:—

Petroleum jelly	- - - -	25%	
Colza oil	- - - -	5%	
Silicone marketed under the R.T.M. "Rhodorsil Oil 3322"	- - - -	2%	
Diolate of polyethylene glycol (density 1.03 at 25° C.)	- - - -	8%	
Glycerol mono- and distearate mixture (m.p. 56° C. density 0.97 at 25° C.)	- - - -	4%	
Water	- - - -	56%	

EXAMPLE 3.

In the yeast industry, tests have been carried out in fermentation vats having a capacity of 125 cubic meters, filled to 90 cubic meters. During the fermentation; air at an hourly rate kept above 9000 cu. meters is caused to flow through a molasse nutritive wort having a concentration ratio molasse/water of 1:10 by weight, and results proved that the consumption of the novel antifoam agent obtained as per Example 1 hereabove did not exceed 3 grams per kilogram of yeast collected, 90 cu. meters of wort yielding about 9 to 10 tons of yeast.

Several scores of tests carried out under these conditions proved that the quantity of antifoam agent utilized ranged 2.3 to 2.8 grams per kilogram of yeast obtained at the end of the fermentation process.

WHAT WE CLAIM IS:—

1. An antifoam agent suitable for use in all industries where foam develops, which consists of an emulsion having the following composition: from .5 to 3% by weight of an organo polysiloxane soluble in alcohol and oils, and insoluble in water, from 20 to 30% by weight of a fatty substance of animal, vegetable or mineral origin, from 5 to 10% by weight of a polyoxyethylated derivative of oleic acid, from 1 to 4% by weight of a polyalcohol-fatty acid ester, and make-up water, this antifoam agent being stable at a

temperature of from 0° to 140° C. and adapted to be sterilized.

2. An antifoam agent as set forth in Claim 1, wherein the organo polysiloxane has a density of 0.99, a surface tension of 22 dynes per cubic centimeter, a refractive index of 1.443 and a viscosity of 95 cst at 25° C.

3. An antifoam product as set forth in Claim 1, wherein the fatty substances of animal origin are fish oil and horse fat, the fatty substances of vegetable origin are peanut oil and colza oil, and the fatty substances of mineral origin are, petroleum jelly paraffin oil and solid paraffinic greases.

4. An antifoam agent as set forth in Claim 1, wherein the emulsifier consists of dioleate of polyethylene glycol, which is a product soluble in oils, alcohol and hydrocarbons, and has a density of 1.03 at 25° C.

5. An antifoam product as set forth in Claim 1, wherein the stabilizer consists of glycerol mono- and distearate mixture having a m.p. of 56° C. and a density of 0.97 at 25° C.

6. An antifoam agent as set forth in Claim 1, which is obtained in liquid form.

7. An antifoam agent as set forth in Claim 1, which is obtained in pasty form.

8. An antifoam agent in the form of a liquid emulsion consisting of 20% of paraffin

oil, 10% of peanut oil, 3% of organic polysiloxane having a density of 0.99, a surface tension of 22 dynes per cubic centimeter, a refractive index of 1.443 and a viscosity of 95 cst at 25° C. 3% of glycerol mono- and distearate mixture, 10% of dioleate of polyethylene glycol and 54% of water, this product being stable at from 0° to 140° C. and adapted to be sterilized.

9. An antifoam agent in the form of a pasty emulsion consisting of 24% of petroleum jelly, 5% of colza oil, 2% of organic polysiloxane having a density of 0.99, a surface tension of 22 dynes per cubic centimeter, a refractive index of 1.443 and a viscosity of 95 cst at 25° C. 8% of dioleate of polyethylene glycol, 4% of glycerol mono- and distearate mixture and 56% of water, this product being stable at a temperature of from 0° to 140° C. and adapted to be sterilized.

10. An antifoam agent substantially as described herein and as illustrated by Example 1 or Example 2.

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